AMENDMENTS TO THE CLAIMS

1. (Withdrawn) An analytical device comprising: a substrate having a first surface; a crater formed in the first surface of said substrate; a sensing element integrated within said substrate proximal said crater, said sensing element configured to detect one or more physical properties within said crater; and a force transduction element located proximal the crater and configured to generate a field that attracts one or more sample particles toward the crater, wherein at least one of said one or more particles is of sufficient size to close the opening in the first surface of the substrate defined by the crater.

2. (Withdrawn) The device of claim 1, wherein the sensing element is located proximal the bottom of the crater.

3. (Withdrawn) The device of claim 1, wherein the sensing element is located proximal a side wall of the crater.

4. (Withdrawn) The device of claim 1, wherein the sensing element is selected from the group consisting of a pH sensor, an optical sensor, a radiation sensor, a magnetic induction sensor, a temperature sensor and a pressure sensor.

5. (Withdrawn) The device of claim 1, wherein the force transduction element includes one or more conducting coils, said conducting coils producing a magnetic field when a current is applied thereto.

6. (Withdrawn) The device of claim 5, wherein said one or more coils are located around the perimeter of the crater opening proximal the first surface of the substrate.

7. The device of claim 5, wherein said one or more coils are located around the perimeter of the

crater extending into the substrate along at least a portion of the crater depth.

8. (Withdrawn) The device of claim 5, wherein said one or more sample particles each include a magnetic or magnetizable bead.

9. (Withdrawn) The device of claim 1, wherein the opening in the substrate define by the crater is one of a circular and a square opening.

10. (Withdrawn) The device of claim 1, wherein the depth of the crater is less than about 1 mm deep.

11. (Withdrawn) The device of claim 1, wherein the width of the crater opening is less than about 1 mm.

12. (Withdrawn) The device of claim 1, wherein the force transduction element includes one or more conducting electrodes, said electrodes producing an electrostatic field when a voltage is applied thereto.

13. (Withdrawn) The device of claim 12, wherein said one or more sample particles each include an electrically charged bead.

14. (Withdrawn) The device of claim 1, wherein one or more of said sample particles are directed into the crater by the field generated by the force transduction element.

15. (Withdrawn) An analytical device comprising: a substrate having a first surface; a crater formed in the first surface of said substrate; a lid particle introduced in a fluid medium proximal said crater, wherein said lid particle is of sufficient size to close the opening in the first surface of the substrate defined by the crater; and a force transduction element located proximal the crater

and configured to generate a field that attracts said lid particle toward the crater in response to a control signal so as to close the crater.

16. (Withdrawn) The device of claim 15, wherein the force transduction element includes one or more conducting coils.

17. (Withdrawn) The device of claim 16, wherein said one or more coils are located around the perimeter of the crater opening proximal the first surface of the substrate.

18. (Withdrawn) The device of claim 16, wherein said one or more coils are located around the perimeter of the crater opening extending into the substrate along at least a portion of the crater depth.

19. (Withdrawn) The device of claim 16, wherein the lid particle includes a magnetized micro-bead.

20. (Withdrawn) The device of claim 15, wherein the force transduction element includes one or more conducting electrodes.

21. (Withdrawn) The device of claim 20, wherein the one or more electrodes are positioned proximal the perimeter of the crater opening.

22. (Withdrawn) The device of claim 20, wherein the one or more electrodes are positioned within the crater.

23. (Withdrawn) The device of claim 20, wherein the lid particle includes an electrically charged micro-bead.

24. (Withdrawn) The device of claim 15, further comprising a sensing element integrated within said substrate proximal said crater, said sensing element configured to detect one or more physical properties within said crater.

25. (Withdrawn) The device of claim 24, wherein the sensing element is located proximal the bottom of the crater.

26. (Withdrawn) The device of claim 24, wherein the sensing element is located proximal a side wall of the crater.

27. (Withdrawn) The device of claim 15, further comprising a sensor module including a sensing element, wherein said sensing module is positioned proximal said substrate such that said sensing element is located proximal the bottom of said crater.

28. (Withdrawn) The device of claim 15, further comprising a sensor module including a sensing element, wherein said sensing module is positioned proximal said substrate such that said sensing element is located proximal a side wall of said crater.

29. (Withdrawn) The device of claim 15, further comprising one or more sample particles introduced in said fluid medium, wherein at least one of said sample particles is directed into the crater by the field generated by the force transduction element prior to the crater being closed by the lid particle.

30. (Withdrawn) An analytical device comprising: a substrate having a first surface; a crater formed in the first surface of said substrate; a sensing element integrated within said substrate proximal said crater, said sensing element configured to detect one or more physical properties within said crater; and a sample particle introduced in a fluid medium proximal said crater, wherein said crater is substantially commensurate in shape and size with a portion of said sample

particle so as to hold said sample particle in place therein.

31. (Withdrawn) An analytical system, comprising: a substrate having a first surface; a crater formed in the first surface of the substrate, said crater defining an opening in the first surface of said substrate; and means for closing said opening so as to substantially seal off samples trapped in the crater from the surrounding environment.

32. (Withdrawn) The system of claim 31, wherein said means for closing includes a micro-bead of sufficient size to close the opening and a force transduction element configured to direct the micro-bead to the opening.

33. (Withdrawn) The system of claim 32, wherein the micro bead is a magnetized bead, and wherein the force transduction element includes one or more conducting coils.

34. (Withdrawn) The system of claim 32, wherein the micro bead is an electrically charged magnetized bead, and wherein the force transduction element includes one or more conducting plates.

35. (Withdrawn) The system of claim 31, wherein the means for closing the opening includes a micro-shutter.

36. (Withdrawn) The system of claim 31, wherein the means for closing the opening includes one of an electrostatically controlled sliding door and a magnetostatically controlled sliding door.

37. (Withdrawn) The system of claim 31, further comprising sensing means located proximal the crater for sensing one or more conditions within said crater.

38. (Withdrawn) The system of claim 37, wherein the sensing means includes one of a pH

sensor, an optical sensor, a radiation sensor, a magnetic induction sensor, a temperature sensor and a pressure sensor integrated in the substrate.

39. (Previously Presented). A method of localizing known amounts of sample materials at each of one or more specific locations on a substrate, each specific location including an individually addressable force transducing element, the method comprising:

providing a plurality of sample particles proximal the substrate;

selectively activating one or more of said force transducing elements, wherein the activated force transducing elements generate a field that attracts one or more of said particles to the corresponding specific locations; and

detecting, at one or more of the activated locations, the number of particles attracted to the location, wherein the number of attracted particles is discrete and predetermined.

40. (Original) The method of claim 39, wherein each location includes a crater formed in said substrate proximal the force transducing element.

41. (Original) The method of claim 40, wherein the sample particles include magnetized beads, and wherein detecting includes detecting inductance changes in one or more conducting coils proximal the crater, said inductance changes caused by said particles entering said crater.

42. (Withdrawn) An analytical device comprising: a substrate having a first surface; and an array of locations patterned on the substrate, each location including: a crater formed in the first surface of said substrate; a sensing element integrated within said substrate proximal said crater, said sensing element configured to detect one or more physical properties within said crater; and a force transduction element located proximal the crater and configured to generate a field that attracts one or more sample particles toward the crater; and a fluid medium disposed proximal at least a portion of said array of locations, said fluid medium including a plurality of said sample particles.

43. (Withdrawn) The device of claim 42, wherein said plurality of sample particles includes a plurality of lid particles, each of sufficient size to close one of the openings in the first surface of the substrate defined by said craters.

44. (Withdrawn) The device of claim 42, wherein said plurality of sample particles are each substantially commensurate in shape and dimension as the craters.

45. (Withdrawn) The device of claim 42, wherein said sample particles include magnetic or magnetizable micro-beads.

46. (Previously Presented) The method of claim 39, wherein the force transducing element generates a magnetic field.

47. (Previously Presented) The method of claim 39, wherein the sample particles comprise magnetically active particles.

48. (Previously Presented) The method of claim 47, further comprising applying a substantially uniform magnetic field to a portion of the substrate to increase the force on or between the magnetically active particles, wherein the uniform magnetic field is generated by an element with low power consumption.

49. (Previously Presented) The method of claim 48, wherein said uniform magnetic field comprises the field of a permanent magnet.

50. (Previously Presented) The method of claim 39, wherein the step of detecting further comprises detecting with a sensing element that is selected from the group consisting of: a pH

sensor, an optical sensor, a radiation sensor, a magnetic induction sensor, a temperature sensor and a pressure sensor.

51. (Previously Presented) The method of claim 39, wherein the step of detecting further comprises detecting with a sensing element that has a position relative to the specific locations selected from a group of positions consisting of: under the specific locations, adjacent to the specific locations, surrounding the specific locations, above the specific locations, between the specific locations, operably connected to the specific location by a signal-routing conduit, and combinations thereof.

52. (Previously Presented) The method of claim 39, further comprising controllably repelling at least one of said particles from at least one of said locations.

53. (Previously Presented) The method of claim 39, further comprising localizing a predetermined number of particles a predetermined specific location.

54. (Previously Presented) The method of claim 39, further comprising regulating the number of particles at a location by repelling additional particles from that location.

55. (Previously Presented) The method of claim 39, further comprising jointly controlling a plurality of the force transducing elements to pass a predetermined number of the particles between two adjacent locations.

56. (Previously Presented) The method of claim 55, wherein the sample particles comprise magnetically active particles and the force transducing element generates a magnetic field that transduces force to at least some of the magnetically active particles.

57. (Previously Presented) The method of claim 56, further comprising applying a substantially uniform magnetic field to a portion of the substrate to increase the force on or between the magnetic particles, wherein the uniform magnetic field is generated by an element with low power consumption.

58. (Currently Amended) The method of claim 48, wherein said uniform magnetic field comprises a ~~battery-powered~~ portably-powered device.

59. (Currently Amended) A method of controllably localizing particles at specific locations on a substrate, each specific location proximal to an individually addressable force transducing element, the method comprising:

providing a plurality of particles proximal to the substrate;

providing a substantially uniform magnetic field of low power consumption that encompasses the specific locations and the particles;

selecting one or more force transducing elements to be activated; and

controllably localizing one or more particles to the specific locations by activating the selected force transducing elements to transduce a motive force to one or more particles proximal to the corresponding specific location, wherein the magnitude of the transduced force is substantially altered by the presence of the uniform field~~.~~; and

detecting, at one or more of the activated locations, the number of particles attracted to the location, wherein the number of attracted particles is discrete and predetermined.

60. (Previously Presented) The method of claim 59, wherein the uniform field comprises the field from a permanent magnet.

61. (Previously Presented) The method of claim 59, wherein the uniform field includes a time-varying component.

62. (Previously Presented) The method of claim 59, further comprising regulating the passage of electromagnetic radiation by controlling the positioning of one or more of the particles.

63. (Previously Presented) The method of claim 59, wherein the uniform field is produced by a portable device.

64. (Previously Presented) The method of claim 59, further comprising the step of regulating the uniform field or force transduction element to reduce contact between the particles.

65. (Previously Presented) The method of claim 59, further comprising the step of regulating the clumping of the particles using a method that is selected from the group consisting of: applying vibrations, applying electrical fields, incorporating charges within the particles, applying magnetic fields, or adjusting fluid flow to reduce contact between the particles.

66. (Previously Presented) The method of claim 59, wherein the particles are selected to comprise one or more discrete groups, and wherein each group has at least one substantially similar physical characteristic that affects localization of the group.

67. (Previously Presented) The method of claim 66, wherein at least one of the groups comprises particles of substantially similar size or effective radius.

68. (Previously Presented) The method of claim 66, wherein at least one of the groups comprises particles selected to comprise a substantially uniform shape.

69. (Previously Presented) The method of claim 59, further comprising the step of controllably moving at least one of the particles from a first preferred location to a second preferred location by activation of force transducing elements.

70. (Previously Presented) The method of claim 69, further comprising sensing localization of the particle proximal to a preferred location.

71. (Previously Presented) The method of claim 59, further comprising:

releasing one or more of the particles from the corresponding specific locations; and

recovering the one or more released particles from the substrate.

72. (Previously Presented) The method of claim 59, wherein the force transducing elements generate a magnetic field, and the particles are magnetically active.

73. (Previously Presented) The method of claim 72, wherein the magnetically active particles include one or more discrete groups that are distinguishable on the basis of physical properties that affect their localization with respect to properties that is selected from the group of properties consisting of: magnetic field strength, time-bearing magnetic fields, viscosity of surrounding fluid, resistance of surrounding fluid, density, mass, inertia, size, geometric shape, and effective radius.

74. (Previously Presented) The method of claim 40, wherein the sample particles comprise a plurality of lid particles of sufficient size to substantially close the opening of the crater.

75. (Previously Presented) The method of claim 40, wherein the attracted particles move a substantial distance, the distance being sufficient to exceed the radius of the respective particle.

76. (Previously Presented) The method of claim 69, wherein the first preferred location and the second preferred location controllably exchange one particle.

77. (Previously Presented) The method of claim 39, further comprising using a microfabricated sensor for detection.

78. (Previously Presented) The method of claim 70, further comprising using a microfabricated sensor for sensing localization.